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ABSTRACT

This paper discusses the building of a hypermedia-based reference station at the Wright Laboratory Technical Library, Wright-Patterson Air Force Base, Ohio. Following this, the paper focuses on an electronic user survey from which data is collected and analysis is made. The survey data is used in a rapid prototyping approach, which is defined as system development based on continuous user input. The prototype reference station (in reality hypertext at present and not yet hypermedia), named "AskMe," was introduced in April 1994, and the study was conducted by an on-line survey instrument available on AskMe. Overall, the low number of responses, only nine over two months, was disappointing. Survey results were not a good evaluation of AskMe's effectiveness, but this does not mean that the method is useless. At this point in the rapid prototyping process, the best way to evaluate AskMe is through communication among the developer, other library staff, and users. The rapid prototyping approach appears to lie outside the paradigm of conventional research because it appendix includes the survey instrument. (Contains 35 references.) (SLD/MAS)

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Utilizing a Rapid Prototyping Approach in the Building of a Hypermedia-Based Reference Station

A Master's Research Paper submitted to the
Kent State University School of Library and Information Science
in partial fulfillment of the requirements
for the degree Master of Library Science

by

Dan Sell

July, 1994

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Utilizing a Rapid Prototyping Approach in the Building of a Hypermedia-Based Reference Station

This paper discusses the building of a hypermedia-based reference station at the Wright Laboratory Technical Library, Wright-Patterson Air Force Base, OH. A rapid prototyping approach is used in the system's development in that it is based upon continuous library user input. Included is a brief discussion of methodology and procedures, a literature review, and project background. Following this, the paper focuses on an electronic user survey from which data is collected and an analysis is made. Challenges and obstacles to the administration of the survey instrument are also discussed. A conclusion is then drawn based upon the efforts of the previous year. The goal of this project is to facilitate access to information both within and beyond the physical bounds of the library, thus resulting in a higher level of service to users.

Master's Research Paper by

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INTRODUCTION

Computerized user systems are commonplace in libraries today. Online public access catalogs, CD-ROM workstations, and library orientation systems are but a few of the applications that have come about as a result of technological advances. A more recent application that has appeared in libraries is the hypermedia-based orientation/reference station. How well these stations meet user needs is of crucial interest to the libraries that design and maintain them. Obtaining user input on a constant basis and making modifications accordingly is an approach that can be used to achieve the best "fit" in terms of meeting needs.

OBJECTIVE

The objective of this research and development project is to incorporate user input into the design and maintenance of a hypermedia-based reference station which will facilitate access to resources both within and beyond the physical boundaries of the library.

PROCEDURES

A literature search in several areas was conducted from July 1993 to June 1994. These areas included hypertext and hypermedia history, human-machine interaction theory as it relates to hypermedia, hypermedia stations already placed in libraries, rapid prototyping, and the evaluation of the effectiveness of both human and automated reference service. The prototype reference station, named "AskMe" which has also been under development since July 1993, was introduced into the Wright Laboratory Technical Library at Wright-Patterson Air Force Base, OH in mid-April 1994. A study was conducted in which an online survey instrument was made available on AskMe from May 16 to July 11. Data was collected and tabulated during this time. This paper details these project activities as well as provides a review of background literature and a discussion of future plans.

LIMITATIONS

The study discussed in this paper comprises but one phase of the rapid prototyping process. This phase involves the collection electronically of user data from one site, that being the Wright Laboratory Technical library.

DEFINITION OF TERMS

"Reference station" refers to a microcomputer-based system designed to aid library users in accessing information contained both within and outside of a library.

"Hypermedia" is defined as text, graphics, video, and audio linked in such a way as to allow a user to access information easily and non-sequentially.

"Rapid prototyping" is the design and presentation of many trial versions of a product in a short period of time based upon continuous interaction between developer and customer.

"Effectiveness" is defined as the level of user satisfaction with the system's performance in either answering a question or leading one to an answer, providing such an answer indeed exists.

METHODOLOGY

AskMe has been set up at the Wright Laboratory Technical Library at Wright Patterson Air Force Base, OH. The computer hardware consists of a Unisys 386-based PC with a 14" VGA color monitor. A keyboard and mouse are also provided. A larger monitor was desirable but none was available. At the first opportunity, a 16-19" monitor will be substituted. The software platform consists of ToolBook v 1.5 running on Windows 3.1. ToolBook was chosen as a result of its favorable mention in the literature and its reasonable price. Presently, the AskMe application is mounted on a DECnet common drive using Runtime ToolBook and the required network program that is also provided with ToolBook. As a result, AskMe is available to users in the library while enhancements to the system can be developed at and implemented from another site in-house. These enhancements will be based upon feedback from users concerning how effectively this reference station is able to answer questions outright or lead to other sources that will provide answers.

Anonymous input from users concerning AskMe's effectiveness has been gathered by means of an eleven-question electronic survey instrument. A similar approach to administering an instrument was used in a study concerning the U-Search CD-ROM service at the University of North Carolina Davis Library.[1] This

[1]Tim Bucknall and Rikki Mangrum, "U-Search: A User Study of the CD-ROM Service at the University of North Carolina at Chapel Hill," RQ 31 (Summer 1992): 542-554.

method was chosen for the study because it required no extra human resources and could be utilized in silence. The Wright Laboratory Technical Library has a small staff which serves a relatively large user community, thus methods involving formal observation and recording of data would have been highly disruptive in terms of service to this community. In addition, any methods such as formal interviews, besides consuming time and already over-extended staff resources, would have been a potential disturbance to customers.

The AskMe survey is accessible by clicking on a button in the upper right-hand corner of any screen. Data has been collected electronically and then placed into text files named according to the date of retrieval. Modifications designed to increase the effectiveness of the reference station will be made based upon analysis of this input.

LITERATURE REVIEW

Hypermedia

Within the past few years, reference stations have sprung up in libraries nationwide. This option has been made more attractive by the development of hypermedia. The term hypermedia is an expansion of the term hypertext. Both terms were coined by Ted Nelson in 1965. Hypertext has been defined by him as "non-sequential writing--text that branches and allows choices to the reader, best read at an interactive screen."[2] While hypertext refers to textual information, hypermedia includes graphics, video, and audio as well as text.

The concept of non-sequential organization of materials can be traced back to 1945 when Vannevar Bush described the "memex" which would have allowed one to retrieve interrelated miniaturized documents stored inside a mechanical/electrical desk.[3] The idea of the memex stayed with Bush throughout the rest of his life, and in his book Pieces of the Action he stated that "The day is not yet here, but has come far closer."[4]

At this time, Nelson was already at work on his Xanadu project. This undertaking involved the development of a system

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[2]Theodore Holm Nelson, Literary Machines 90.1 (Sausalito CA: Mindful Press. 1990), 0/2.

[3]Vannevar Bush, "As We May Think," Atlantic Monthly, 176 no. 1, (July 1945): 101-108.

[4]Vannevar Bush, Pieces of the Action (New York: Morrow, 1970), 190.

which would allow one not only to access and produce electronic documents but also to link them together. Xanadu is still under development today, combining hypertext and networking principles.

Another important figure in the history of hypermedia and, for that matter, the history of human-computer interaction, was Doug Engelbart, the inventor of the mouse.[5] From the late 50s, his work at Stanford Research Institute has increased our understanding of how computers can be used as an extension of the human in performing tasks. Engelbart's device is presently the central tool in most hypermedia systems.

As technological advances improved the power of computer systems, the fascination with hypertext increased. By the mid-1980s, Apple had introduced HyperCard for its Macintosh line of microcomputers. This brought hypermedia capabilities into the schools and libraries. The first use of HyperCard in a library setting is believed to be by Marty Kesselmen at Rntgers University. In 1984, he used a pre-released version of HyperCard to develop LSM InfoMaster, a library instruction program still in use today.[6]

By the late 80s, hypermedia was being utilized throughout the library environment for instructional and reference uses.

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[5]Robert A. Szymanski and others, Introduction to Computers and Information Systems (Columbus, Toronto, Lomdom, Melbourne: Merrill Publishing Company, 1988), 71.

[6]Susan Borden and Margaret Osburn, "The Video File: Interactive Marketing for the Library Part 2," Marketing Treasures 6 no. 5, (May/June 1993): 3.

Presently, systems are in place, being set up, or planned in many libraries. Internet listserves such as LIBREF-L have contained requests for information and advice from those seeking to set up such hypermedia systems. A company, TTSS (Rockville, MD), has developed the SelfInform electronic directory system which utilizes text, graphics, and video to provide information to users.[7] Libraries that use SelfInform include the University of Tennessee, the University of California at San Diego, and Los Angeles Public Library.

Through this period including the present, many hypertext and hypermedia authoring systems have made their appearance. Commercial Products such as ToolBook, HyperWriter, Hyperties, LinkWay, and shareware such as HYPER and HYPER2 have been and/or are being used. Other software packages that have hypertext capabilities include AskSam, Knowledge Pro, and Owl Guide.[8] The University of Texas-Pan American Library has set up a hypermedia-based system using Guide.[9]

ToolBook, released in early 1990, was the first product of Asymetrix Corp. The company, located in Redmond, WA, was founded by Microsoft co-founder Paul Allen in 1985. Billed as a "software construction set", ToolBook was to be released at the

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[7]TTSS, TTSS News of '93 (Rockville MD: TTSS, 1993): 1-4.

[8]Clifford Urr, "Will the Real Hypertext Please Stand Up?," Computers in Libraries 11 no. 5 (May 1991): 46.

[9] Richard H. Fowler, Susan B. Hancock, and Wendy A. L. Fowler, "A Hypermedia System To Explain Library Use,"Computers in Libraries 13 no. 11 (December 1993): 14-18.

same time as Microsoft Windows 3.0. This product, in effect, was the Windows answer to HyperCard.[10] Libraries wasted no time in setting up ToolBook applications. The University of the District of Columbia Library developed a hypermedia library orientation system utilizing it.[11]

Rapid Prototyping

The concept of rapid prototyping goes back to the mid 1970s and is rooted in manufacturing/design and software engineering. In the mid 1980s, as technological improvements allowed for more powerful rapid prototyping tools, the literature dealing with this area increased tremendously. A great deal of this work has dealt with software development. Two books that explain the RP process in the context of the AskMe project are Rapid Prototyping for Object-Oriented Systems by Mark Mullin, published in 1990, and Rapid Evolutionary Development: Requirements, Prototyping, and Software Creation by Lowell Jay Arthur, published in 1992. One example of rapid prototyping of hypertext/hypermedia systems are the use of ProtoTymer, a HyperCard RP tool developed at Sandia National Labs in collaboration with Stone Design Software

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[10]Rami Grunbaum, "Asymetrix Will Unveil Its Long-Secret Software This Week," Puget Sound Business Journal 7 no. 2, (21 May 1990): 17.

[11]Chet Sarangapani, "Development and Evaluation of a Hypermedia Library Orientation System," In Proceedings of the 12th National Online Meeting Held in New York, May 7-9, 1991 (Medford, New Jersey: Learned Information, Inc.): 343-348.

Inc.[12] ProtoTymer works by fitting itself around a copy of a HyperCard application prototype when installed. Then when the prototype is run, ProtoTymer records user activity for later analysis. Another is the development of Test Engineering Browser, a hypertext knowledge base tool used for spacecraft testing at NASA's Jet Propulsion Laboratory.[13] This was done through close co-operation by all those involved in the process. Today, there are a variety of tools available to rapid prototype hypersystems. One that was recommended in 1990 in PC Magazine was ToolBook.[14]

Evaluation Of Human Reference Service

Evaluation of reference service involving human-to-human interaction has been an elusive phenomenon. Samuel Rothstein, in 1964, stated that "The measurement and evaluation of reference service has been more often discussed than attempted."[15] Since

[12]Dwight P. Miller and Andrew C. Stone, "ProtoTymer: Human Performance Instrumentation for HyperCard Prototyping," In Proceedings of the Human Factors Society 33rd Annual Meeting Held in Denver, Colorado on October 16-20, 1989 (Santa Monica, CA: Human Factors Society): 249-253.

[13]Irene Wong Woerner, Capturing Flight System Test Engineering Expertise: Lessons Learned (Pasadena, CA: California Institute of Technology, Jet Propulsion Laboratory, 1991), 273, NASA, N91-22790

[14]Richard Hale Shaw, "ToolBook Puts Windows Development in the Hands of Power Users," PC Magazine 9 no. 13 (July 1990): 36.

[15]Samuel Rothstein, "The Measurement and Evaluation of Reference Service," Library Trends 12 (January 1964): 456.

then, efforts have been made to better define reference transactions as well as to perform evaluations and measurements. ANSI Standard Z39.7, revised in 1983, defines a reference transaction as "an information contact that involves the use, recommendation, interpretation, or instruction in the use of one or more information sources, or knowledge of such sources, by a member of the reference or information staff."[16]

A number of methodologies have been offered in this time period. The work of Terrence Crowley and Thomas Childers in the late 60s and early 70s concerning unobtrusive measurement of the accuracy of reference services, although well cited, has had questionable impact on the library-information profession's outlook concerning research in this area.[17] Another approach to reference service evaluation was put forth by F. W. Lancaster, whose discussion of librarian-customer abilities and attitudes as well as environmental factors set up criteria which could be used as a basis for measurement.[18] In addition, Terry Weech proposed another model involving evaluations by the librarian him/herself,

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[16]Council of National Library and Information Associations, American National Standard for Library and Information Sciences and Related Publishing Practices- Library Statistics (New York: American National Standards Institute, 1983): 28, ANSI, Z39.7-1983

[17]Alvin M. Schrader, "Performance Standards for Accuracy in Reference and Information Services: The Impact of Unobtrusive Measurement Methodology," The Reference Librarian no. 11 (Fall/Winter 1984): 197-214.

[18]F. W. Lancaster, "Factors Influencing the Effectiveness of Question-Answering Services in Libraries," The Reference Librarian no. 11 (Fall/Winter 1984): 95-108.

the supervisor, and the customer.[19] In 1990, Lynn Westbrook discussed the use of multiple methods in conjunction with each other (triangulation) to evaluate reference service. Those methods were surveys, observation, interviews, and unob-trusive testing.[20]

While there have been efforts involving utilization of some of these methodologies, discussion and commentary concerning this issue still tends to be the rule rather than the exception.

The literature concerning the evaluation of reference service tends to lack examples of survey instruments. The best example found was the Reference Transaction Assessment Instrument (RTAI) developed by Marjorie Murfin and Gary Gugelchuk with funding and support from Ohio State University in the early 80s.[21] Murfin and Charles Bunge also collaborated on a project to develop an instrument intended to compare the quality of academic libraries' reference service.[22] This survey involved the use of computer-readable answer sheets, each of which would correspond to a reference transaction. Participating libraries

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[19]Terry L. Weech, "Who's Giving All Those Wrong Answers? Direct Service and Personnel Evaluation." The Reference Librarian no. 11 (Fall/Winter): 109-122.

[20]Lynn Westbrook, "Evaluating Reference: An Introductory overview of Qualitative Methods," RSR (Spring 1990): 73-78.

[21]Marjorie E. Murfin and Gary M. Gugelchuk, "Development and Testing of a Reference Transaction Assessment Instrument," College and Research Libraries 48 (July 1987): 314-338.

[22]Marjorie E. Murfin and Charles Bunge, "Evaluating Reference Service From the Patron Point of View: Some Interim National Survey Results," The Reference Librarian no. 11 (Fall/Winter): 175-182.

would submit a collection of answer sheets corresponding to one day's transactions. These forms would then be input for data analysis.

Evaluation of Computerized Reference Stations

In the area of evaluation of computerized reference systems, a survey was conducted in 1992 at the University of Houston by Kathleen Gunning and Kimberly Speyers-Duran.[23] The system, called Reference Expert, was evaluated using a paper survey which asked users to answer demographic questions as well as questions determining familiarity with field of study, ease of use, and user preference (Reference Expert or human staff).

Evaluation of hypermedia reference stations, or for that matter, any library hypermedia application, has focused on the user satisfaction with the system's interface as opposed to its ability to render satisfactory answers to reference questions. A major tool for measuring user interface satisfaction is the Questionnaire for User Interaction Satisfaction (QUIS) developed by Kent Norman and Ben Shneiderman at the University of Maryland.[24] In 1988, Joan Cherry and Marshall Clinton conducted

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[23]Kathleen Gunning and Kimberly Speyers-Duran, "Evaluation of Reference Expert: An Expert System for Selecting Reference Sources," Research in Reference Effectiveness (Chicago: Reference and Adult Services Division, American Library Association, 1993): 111-129.

[24]John P. Chin, Virginia A. Diehl and Kent L. Norman, "Development of an Instrument Measuring User Satisfaction

a survey of user satisfaction with the University of Toronto's FELIX online catalog utilizing a variation of the QUIS.[25] In 1990, Cherry and Clinton conducted a similar survey of five online catalogs at universities in Ontario.[26] Both surveys also involved the gathering of user demographic data. Patricia Thomas, at Kent State University, conducted a study concerning satisfaction with the user interface of the Silver Platter ERIC CD-ROM on the Macintosh. Her study, conducted in 1993, involved use of the QUIS as well as observation and a technique known as the "think-aloud protocol."[27] While the QUIS focuses on such issues as size and shape (font) of characters, screen layout, commands, and task performance, it does not directly deal with the system's ability to answer a reference question to a user's satisfaction.

While there are studies of user satisfaction with human reference service published in the literature, there is little yet that examines satisfaction with computerized reference

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of the Human-Computer Interface," In CHI '88 Held in Washington, D.C. on May 15-19, 1988 (New York: Association for Computing Machinery, 1988): 213-218.

[25]Joan M. Cherry and Marshall Clinton, "A Profile of User Backgroud and User Satisfaction With the University of Toronto OPAC and the Implications for User Training and User Interfaces," In Proceedings of the 52nd Annual Meeting of the American Society for Information Science Held in Washington, D.C. on October 30-November 2, 1989 (Medford, New Jersey: Learned Information Inc.): 121-128.

[26]Joan M. Cherry and Marshall Clinton, "OPACs at Five Ontario Universities: A Profile of Users and User Satisfaction," Canadian Library Journal. 49 no. 2 (April 1992): 123-133.

[27]Patricia S. Thomas, "The User Interface of ERIC on the Macintosh: A Qualitative Study of Novice Users" (Master's research paper, Kent State University, 1993), 23-24.

stations. A possible reason for this is that development of these systems has been going on for less than ten years. Much of the literature dealing with hypertext/hypermedia reference and orientation systems concerns development, implementation, and features. That which does evaluate such systems focuses on issues other than the ability to lead one to a satisfactory answer to a reference question.

PROJECT ASKME

Before AskMe

The seeds of AskMe were sewn in the Fall of 1991 when a "hypermap" of the Wright Laboratory Tech Library was designed using the shareware package HYPER. This was for demonstration purposes only. The hypermap consisted of layouts of sections of the library linked with each other as well as linked with descriptive text placed in pop-out windows. The source file was in ASCII format which was then compiled by HYPER to create the hypertext. There were limitations to this environment in that complex hypersystems required the creation of very large text files that became cumbersome to edit. The size of these files exceeded the memory capabilities of screen editors such as PC-Edit and TED. One needed to use a word processing program such as WordPerfect to handle the file. As a result, debugging was an exercise in tossing files between HYPER and WordPerfect. A more robust environment was desired.

E nter ToolBook

Since the library utilized PCs, HyperCard was out of the question. Regardless of that, other projects and activities within the library caused the hypermap to be put on hold. Interest was rekindled upon discovery, in a journal article, of a powerful piece of software called ToolBook. In 1993, serious

effort was put forth toward the development of a system that would be more than just a "hypermap." The goal now was to design a working prototype of a fully functioning hypermedia-based reference station. Further investigation into ToolBook and other packages such as HyperWriter and AskSam yielded a decision to go with ToolBook as the software platform.

In July/August of 1993, the philosophy behind and plans for the yet-unnamed reference station were documented. With the acquisition of the ToolBook software in August, work on the reference station began in earnest.

AskMe

The name "AskMe" was chosen out of a desire to invite library customers to use the reference station. Inspiration was drawn from Valerie Feinman's scenario in which a sign next to a library orientation station says "TRY ME!."[28] The name is simple and gives the reference station an aura of personality. From the beginning, AskMe has been considered a uinque entity able to change and grow to meet user needs. At present, the AskMe prototype is in reality hypertext and not hypermedia. The reason for this is that while library maps were a part of earlier versions, they were removed doe to obsolescence resulting from movement of staff and resources taking place over a period of months. Consequently, the prototype contains text only. However

[28]Valerie Feinman, "Hypertext and Library Instruction. Computers in Libraries. 13 no. 6 (June 1993): 49.

the hypermedia nature of AskMe will be restored in the near future with the inclusion of updated maps.

A major feature of AskMe is the "Query Bar" which, when clicked upon with the mouse, allows a user to type in a word or words (ask) and thus be presented with a screen describing a library service or facility or a suggestion to utilize tools such as the online catalog or the CD-ROMs. As AskMe matures, this feature will become more powerful.

The hypertext nature of AskMe is most evident in the use of "buttons" as "nodes" to link screen describing library facilities or services. Buttons are placed in both menu formation and within other text. Originally "hotwords" or plain text used in a node position was going to be used within other text. However, a decision was made to use buttons in order to make it more evident to the user that clicking on the text would lead somewhere else. Buttons are colored gray to make them stand out above text and background. The only exception to the use of buttons thus far is in the index. Here, fields appearing as gray rectangles are used so that the text within each field can be arrived at through clicking on a button or making a query. This is because button text cannot be used as a destination in ToolBook. These fields, however, function in a manner similar to buttons. In short, it has been decided that anything that is gray in the AskMe environment can be clicked on in order to go elsewhere. In this way, users will not be confused as to what is a node and what is not.

At the bottom of each AskMe screen, with the exception of the Main Menu and Index, are three buttons. One, on the lower left, takes the user to the Main Menu screen while another, on the lower right, goes to the index. These buttons are labeled accordingly. The third button, located in the lower middle, is labeled "Go Back." This button navigates backward to the previous screen used. Clicking on this button allows users to work their way back in order to make other choices at a given "level." As mentioned previously, the Main Menu and Index screens are the exceptions in that buttons that lead to themselves are excluded.

Most textual information is white on a dark blue background. Originally, text was black on a cream-yellow shadowed field on a light brown background. However, the cream-yellow was too bright for large amounts of text. Light blue-green was experimented with and yielded more favorable results. Eventually, for the sake of simplicity, the shadowed-field appearance was eliminated for explanatory text, the text color was changed and the background darkened for ease of reading. Presently only title text is black on a cream-yellow field. The font or "print style" most explanatory text is in a 14-point Courier New bold. Where space is an issue, a smaller point size is used but only if necessary. Title Text is in a 24-point Arial (non-serif) bold font except for the AskMe and Index title text. The AskMe title text is the largest of all, in a 60-point Arial bold while the title text for the index is in a 36-point Arial bold. Originally, all explanatory text was in a 16 to 32-point Arial bold.

The intention was to make the print easy to read for those with varying visual capabilities. However, based on comments that the size of explanatory text was too intimidating and that the text did not look like what users may be used to seeing on a computer screen, the 14-point Courier New bold font was chosen as a satisfactory compromise.

Besides the Query Bar and the interlinked explanatory text, AskMe has two other major features (1) access to in-house dBase databases, and (2) connectivity to Internet resources. Presently, the Wright Laboratory Technical Library's Journal Holdings List is the only dBase database available, but others will follow soon. In this capacity, ToolBook acts as a "front-end" for the dBase database. When one reaches this front-end screen, he/she can click a button to search journal titles. A box is presented which allows one to type in the sought-after title. If there is a find, that record is presented on the screen, if there is no find, a "not found" message appears and the record closest to the query is presented. One also has the option to browse titles forward or backward by clicking on the appropriate button. This is useful if one is not sure of the title or one wishes to look for titles beginning with a word or words which describe an area of interest (i. e. flight or air power). In the future, subject as well as word in title/subject will be made available.

The other major feature of AskMe is the ability to connect to Internet resources originating both within and outside the Library. These resources include the Library's CLSI online public access catalog, the OhioLink service, The individual

catalogs of Wright State University and the University of Dayton, the AFIT (Air Force Institute of Technology) Gateway (which includes the AFIT catalog), LC-MARVEL (Library of Congress), and the Wright-Patterson AFB Information System. This feature brings a tremendous amount of information to the user through access to library catalogs, gopher servers, bulletin boards, and other resources located around the globe.

DATA ANALYSIS

The Survey Instrument

The survey instrument is intended to measure the overall effectiveness of a given prototype of the AskMe reference station. It is meant to be short so that users will not feel bogged down in questions and thus not complete the survey. Questions 1-4, 6,8 and 9 are answerable by one of several choices while Questions 5, 7, 10, and 11 are requests for comments. Answering these questions is not a requirement for completion of the survey; however it opens the door to further user input that is of potentially great value to the developer in the rapid prototyping process.

Questions 1 and 2 are introductory questions. Question 1 pinpoints first-time users as well as others who have used AskMe a few or many times previously. Question 2 asks how first-time users learned of AskMe. Besides giving this information, answers to Question 2, as well as Question 1, can be used as a basis for finding out such things as how first-time users who discovered AskMe by seeing it in the library evaluate it as opposed to those first-time users who learned of it in the base newspaper, the Skywriter.

Question 3 asks if the user found what he/she was looking for. Choices are designed to supply a range of alternatives including that of neutrality. These alternatives are: finding nothing at all, not finding anything relevant to the search but

coming upon information useful in other ways, no opinion, finding information that is relevant but not exactly what is being looked for, and finding exactly what was looked for. This is the question whose answers are monitored for a measure of overall system effectiveness.

At this point, the questions automatically branch. In this way there is no stumbling over screens to get to the next relevant question. Questions 4 and 5 are meant to find the strengths of the system by asking the user to point out the features that led to desired information. Questions 6 and 7, on the other hand, seek to find the weaknesses of the system by asking what kept the user from finding an answer. Questions 4 and 6 allow the user to identify one or more specific items as that which helped or hindered the search. These items are chosen because these are either major system features or potential trouble spots identified by the developer for close user monitoring. In both of these questions, there is an option to put "Other" so that strengths or weaknesses not mentioned can be identified by users in questions 5 and 7. In Questions 3, 4, 6, 8, and 9 a "No opinion" option is offered to allow for complete neutrality. When a user answers "No opinion" to a question, he/she is sent to the next relevant question.

Questions 8-10 deal with a major issue in hypersystems. That issue is the user's ability to navigate the system. Question 8 asks for the degree of ease or difficulty in doing this. Question 9 again asks the user to identify one or more feature-related reasons for having any difficulty in getting

around the system. These are chosen for the same reason as those in Questions 4 and 6. If one answers "Found my way around very easily" or "No opinion" to Question 8, he/she is sent to Question 11.

Question 11 allows the user to enter any other comments he or she may have concerning the system. This opens the door to the addressing of particular issues previously not considered which can help the developer focus on needed improvements that can be made in future versions. Comments that are entered will also be available to the developer as soon as a given survey response is added to the database.

The Data

Text files are created every time a survey is answered. A separate ToolBook application acts as a scoreboard containing cumulative field-cells corresponding to the multiple-choice questions. This template is laid out to look like a survey form with field-cells in the position of the answer boxes for each choice. As each survey is processed, 1 is manually added to the amount in each field-cell which corresponds to a chosen box. This template, as well as individual survey files can be examined at any time. Comments, if any, can be assessed for user perception of strengths and weaknesses. For the purposes of this study, data is being viewed in terms of the way Question 3 (dealing with to which degree the user gets or is led to an answer) is answered.

Results

There were many challenges to this project once AskMe was set up in the Library. Wiring constraints caused the reference station to be set up in a comparatively remote part of the Reference area. This situation was not changed until mid-May when new furniture was installed and new network drops and power cables were put in place. Then AskMe could be placed closer to the Library entrance. Even with this change, response to the survey was very low. There were only nine entries over the two-month period. System error was ruled out as a reason due to the fact that testing was conducted both before implementation and during the data collection period when the lack of responses yielded suspicion. At both times the system was functioning properly. The low rate may have been due to library customers' being too busy with what they had come in to do to answer a survey, no matter how short or concise it may have been. Another possible reason is that customers had no desire to fill out "yet another survey" as such things are common in the present on-base work environment. Yet another possible reason was made evident through one respondent's comment. It stated that he/she "hit the control-arrow to go back a word for editing and a new box came up. I don't know if what I entered in a previous box is still there or not, so I'll try again." In ToolBook, Ctrl-left/right arrow will take one back a "page" (screen) or forward one screen, depending on which key is pushed. It evidently is also the way that one or more editors or word processors allow one to move

backward or forward one word to for editing. Since so many systems are used on-base, it never occurred to the author that this would be a problem, although the possible hitting of Ctrl-left/right arrow was considered. Reasons considered for hitting these keys were accident or a respondent's knowing ToolBook and trying to be "clever". The likelihood of this was thought to be low since screen directions were quite explicit and it was assumed that anyone who did know ToolBook would be co-operative and follow those directions. There may have been instances in which users pushed these keys to edit and, upon finding themselves in another screen, decided to withdraw from the survey.

Overall, the low number of responses was a tremendous disappointment as it was anticipated that this number would be higher. In addition, one of the responses had to be thrown out due to null responses to several questions. Two others were considered questionable since they had null responses to one question apiece, one to Questions 1 and the other to Question 4. However, after much thought on the matter, it was decided to keep these responses because (1) Question 3, the central question, was answered by both, (2) One gave a negative response to Question 3 and answered Question 6, and (3) One of these responses contained the comment concerning the Ctrl-arrow editing situation. The reason for null responses to these questions is probably that a user tried to edit a comment response using Ctrl-arrow and backed into a multiple-choice screen. The survey is set up to so that when one enters a page (screen) any answer that was there is

cleared so that no one can see anyone else's answer(s); thus if someone keeps hitting Ctrl-arrow going backward and forward he/she will eliminate his/her own answers as well. If the user decides to complete the survey, those responses, including null ones, will be put to disk.

Nevertheless, here is the final tally from the scoreboard shown in the tables below:

Table 1.--Question 1. How many times have you used this system previously?

	Never	1-2 times	3-5 times	More then 5 times
Users	4	1	1	1

Table 2.--Question 2. If a first time user, how did you first see or hear about the system?

	Word of mouth	Newsletter/ Skywriter article	Demonstration in Library	Discovery in Library
Users	2	0	0	2

Table 3.--Question 3. Did you find what you were looking for by using this system?

	No, not at all	No, but found useful unrelated information	No opinion	Yes, but not exactly what I was looking for	Yes, exactly what I was looking for
Users	1	0	1	2	4

Table 4.--Question 4. If you answered "Yes", which system feature(s) led you to what you were looking for? (You may click on more than one.)

	Query bar	Journal Holdings list search screen	Descriptions of Library resources and services	Connections to other systems	Other	No opinion
Users	1	1	2	1	0	0

Table 5.--Question 6. If you answered "No", which system weakness(es) kept you from finding what you were looking for? (You may click on more than one.)

	Repeated use of query bar yielded nothing	Limitations in Journal Holdings List searching	Not enough detail in descriptions of Library resources and services	Too much detail in descriptions--cluttered or confusing
Users	0	0	0	0

Table 5. (continued)

	Connections not available to more systems	Too many connections available, hard to choose	Other	No opinion
Users	0	0	0	1

Table 6.--Question 8. How easy or difficult was it to "find your way around" in the system?

	Could not find my way, felt quite lost	Had great difficulty finding my way	No opinion	Found my way around with a little work	Found my way around very easily
Users	0	0	1	5	2

Table 7.--Question 9. If you any difficulty finding your way around, what, in your opinion, caused this?

	Too many screens or levels	Buttons did not lead where I wanted to go	Text was confusing	Other	No opinion
Users	0	2	3	1	0

There were three known first-time users who responded to the survey. Of these three, two answered that they discovered AskMe in the Library while one answered that he/she discovered it through word of mouth. This indicates that at least some customers were curious enough to investigate the new system. The pivotal question, No. 3 was responded to negatively by one individual, and positively by six while one expressed no opinion. The negative respondent said that he/she found nothing. Of the positive respondents, two said that they did not find exactly what they were looking for, however three said that they did. The Query Bar helped one person while descriptions of resources and services helped the other two and the Journal Holdings List and connections to other systems helped one each. "No opinion" was given in the case of the negative response. Since one user answered "No opinion" on Question 3, he/she was branched to Question 8. Question 8 had five persons answer that they found their way around with a little work while two found their way around very easily. One answered "No opinion." The reason for any stumbling was confusing text in three cases. In addition, one respondent also cited buttons not leading to where he/she

wanted to go. One person cited the buttons as a sole reason while one answered "other" but did not comment.

Comments were given by two respondents to the survey. One, answering Question 10, stated that there were "no instructions on backing out of [UnCover]." Another, answering Questions 5 and 10, said, "looked for specific journals, none available here." (Question 5) and "I tried to find specific journal titles. Would be useful if I could get just a list of titles, rather than a dump of details on each title. I wanted to see if I had the title wrong, but close. I just wanted titles, not all the other info at this point." (Question 10).

CONCLUSION

In this particular setting and within the allotted time frame, the survey results alone have not proven to be a good evaluation of AskMe's effectiveness due to the low number of responses. However, that does not lead to a conclusion that the method is useless by any means. Perhaps in a setting such as an large academic library where there are more available resources such an approach, used alone or combined with others, may yield better results. At this stage of the rapid prototyping process for AskMe, given that there is insufficient staff or space to perform other types of formal studies based upon in-house or laboratory observation, the best approach to evaluate AskMe's effectiveness lies in personal communication between developer, other Library staff, and user. All must have a sense of ownership within the process. It is the conclusion of the author, based upon the information gathered and the experience gained over the last year, that the rapid prototyping approach to the building of the hypermedia workstation AskMe, within the context of the Wright Laboratory Technical Library, lies outside the established paradigm of conventional research. It involves constant change based upon constant communication. This can take the form of casual observation and the seeking out of comments and suggestions from users and staff both verbally and electronically.

FUTURE PLANS

The immediate future, as previously mentioned, calls for the placement of library floor maps onto AskMe. Decreased staff, increase in workload, and the devotion of time and energy to this project has delayed the updating of these maps until the present time. Plans also call for linkage to a compiled dBase program allowing the users to search journal holdings by title, subject, or both. Also, users will be able to search journal titles subscribed to (through the Library) by offices in remote locations. In addition, bibliographies concerning issues such ISO 9000 and other "hot topics" may be placed on board. Also, plans call for an upgrade to Multimedia ToolBook which, combined with hardware upgrades, will allow users to view video and other multimedia productions. The ultimate goal is to make AskMe available to users outside the physical boundaries of the library.

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APPENDIX

Electronic Survey Instrument

1. How many times have you used this system previously?

__Never
__1-2 times
__3-5 times
__more then 5 times

2. If a first time user, how did you first see or hear about the system?

__Word of mouth
__Newsletter/Skywriter article
__Demonstration in Library
__Discovery in Library

3. Did you find what you were looking for by using this system?

__No, not at all
__No, but found useful unrelated information
__No opinion
__Yes, but not exactly what I was looking for
__Yes, exactly what I was looking for

4. If you answered "Yes", which system feature(s) led you to what you were looking for? (You may click on more than one.)

__Query bar
__Journal Holdings List search screen
__Descriptions of library resources and services
__Connections to other systems
__Other
__No opinion

5. Please feel free to explain your choice in box.

_____

_____

6. If you answered "No", which system weakness(es) kept you from finding what you were looking for? (You may click on more than one.)

__Repeated use of query bar yielded nothing.
__Limitations in Journal Holdings List searching
__Not enough detail in descriptions of library resources and services
__Too much detail in descriptions--cluttered or confusing
__Connections not available to more systems
__Too many connections available, hard to choose
__Other
__No opinion

7. Please feel free to explain your choice in box.

_____
_____

8. How easy or difficult was it to "find your way around" in the system?

__Could not find my way, felt quite lost.
__Had great difficulty finding my way
__No opinion
__Found my way around with a little work
__Found my way around very easily

9. If you any difficulty finding your way around, what, in your opinion, caused this?

__Too many screens or levels
__Buttons did not lead to where I wanted to go
__Text was confusing
__Other
__No opinion.

10. Please feel free to explain your choice in box.

_____
_____

11. Additional Comments (if any):

_____
_____

Thank you very much for your time and co-operation.